

JAGUAR CONSERVATION FRAMEWORK
FOR ARIZONA, NEW MEXICO, AND NORTHERN MEXICO

Arizona Game and Fish Department
and
New Mexico Department of Game and Fish

Approved by:
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JAGUAR CONSERVATION FRAMEWORK FOR ARIZONA, NEW MEXICO, AND NORTHERN MEXICO

Despite a long history of jaguar presence in the Southwest, jaguar conservation¹ in the Arizona-New Mexico/Mexico borderlands began in 1996, when houndsmen Warner Glenn (1996) and Jack Childs (1998) each photographed a different jaguar in, respectively, New Mexico (on March 7, 1996) and Arizona (on August 31, 1996). By March 1997, their subsequent discussions about those sightings with the Arizona Game and Fish Department (AGFD) and the New Mexico Department of Game and Fish (NMDGF) had helped spur the two agencies to complete a *Conservation Assessment and Strategy for the Jaguar in Arizona and New Mexico* (Johnson and Van Pelt 1997), execute a companion Memorandum of Agreement (MOA), and initiate a borderlands jaguar conservation effort.

In accordance with the 1997 Conservation Assessment/Strategy and MOA, the voluntary, collaborative borderlands jaguar conservation effort has been and continues to be planned and carried out through a Jaguar Conservation Team (JAGCT) convened by AGFD and NMDGF. In 2006-2007, AGFD and NMDGF discussed JAGCT progress and future needs with cooperating agencies and stakeholders from interested nongovernmental organizations and the general public. The process culminated in a re-assessment of the status of jaguar conservation in the borderlands (Johnson et al. in prep.), a new Memorandum of Understanding (MOU) between AGFD and NMDGF for jaguar conservation (Appendix B), and this Framework, which (per the MOU) will guide the borderlands jaguar conservation effort from 2007 through 2011. Each of these three documents thus becomes a stand-alone component of the overall effort. The three documents will be known collectively as the AZ-NM Jaguar Conservation Agreement, but each can be updated as often as necessary without requiring change in either of the other components.

CONSERVATION FRAMEWORK

1. Introduction.

AGFD and NMDGF have crafted this Framework for jaguar conservation to reflect the paramount importance of cooperation with and participation by a broad spectrum of government agencies, private individuals, and nongovernmental organizations. The Framework also acknowledges the importance of compatible rural livelihoods and activities (such as ranching and outdoor recreation, including hunting, fishing, and wildlife watching) to existence of jaguars in the Southwest, and the importance of participation by such stakeholders in wildlife conservation. Thus, the Framework's focus is voluntary collaborative conservation, based on shared values and incentives rather than regulatory requirements.

2. Goal: Conserve Jaguars in the U.S.-Mexico Borderlands.

3. Organizational Structure.

¹ See Glossary (Appendix A) for definitions (e.g. conservation) that JAGCT participants requested for this document.

3.1. Memorandum of Understanding (MOU).

3.1.1. AGFD and NMDGF have executed a 2007 MOU for jaguar conservation (see Appendix B), supporting their broader commitments under Section 6 of the Endangered Species Act (ESA) of 1973, as amended, to maintain adequate conservation programs for species of wildlife of mutual concern with the U.S. Fish and Wildlife Service (USFWS). This Framework will be implemented under the MOU and any successor agreements.

3.1.2. Signatories to the MOU are limited to government agencies, which collectively comprise the JAGCT (see below), but participation in the jaguar conservation effort is open to anyone. Timelines for implementing and completing Conservation Actions within this Framework will necessarily depend on funding and availability of personnel and other resources. Note: participation is voluntary; entities need not contribute funding or other resources to formally or informally participate in the conservation effort.

3.1.3. The Framework is not a regulatory document. It reflects the AGFD and NMDGF commitment to conserving the jaguar in the context of a wide spectrum of other wildlife needs and a variety of uses of federal, state, tribal, and private lands. It will be implemented in coordination with many other planning and management efforts on federal, state, tribal, and private lands, including ecosystem management, wildlife management, allotment management, etc. Note: responsibility for changing plans or taking actions in response to JAGCT recommendations developed under this Framework rests with the appropriate lead (action) agency.

3.1.4. Although this Framework applies to the full historical range of the northern jaguar population, conservation effort will be focused in a priority geographic area (i.e. primary emphasis area; see Appendix B, Fig. 1) that includes all or parts of Santa Cruz, Pima, Pinal, Graham, Greenlee, and Cochise counties in Arizona and all or parts of Catron, Sierra, Luna, Grant, and Hidalgo counties in New Mexico. This will allow available JAGCT resources to be focused where a substantive conservation return is most likely. JAGCT will address expansion of the emphasis area to include other parts of Arizona and/or New Mexico as necessary and in accordance with voting procedures set forth in the MOU (see Appendix B). Conservation effort in Mexico under this Framework is subject to invitation by and permission from Mexico.

3.2. Jaguar Conservation Team (JAGCT).

3.2.1. Agencies signatory to the MOU for jaguar conservation (see Appendix B) are known as Lead Agencies (AGFD and NMDGF) or Cooperators (all others). The distinction reflects that this is a state-led conservation effort, in accordance with applicable state and federal law and AGFD and NMDGF cooperative agreements with USFWS under Section 6 of the ESA. Collectively, the MOU signatories comprise the JAGCT, as noted above. Terms and conditions of eligibility and participation as signatories are detailed in the MOU.

3.2.2. Interested private individuals and nongovernmental organizations are invited and encouraged to participate in this Framework by attending JAGCT public meetings and by participating in voluntary actions to promote jaguar conservation, including public education activities.

3.2.3. Information on JAGCT meetings and activities is provided on AGFD's Web site and through AGFD's self-subscription electronic newsletter, *Endangered Species Updates*.

3.2.4. AGFD and NMDGF will work through the JAGCT to coordinate and direct activities under this Framework, subject to the terms and conditions of the referenced MOU. In this manner, they will review any new information, outline management guidelines, research, and education needs, and identify known and potential funding sources for carrying out this work.

3.2.5. AGFD and NMDGF will convene the JAGCT at least once annually, and more often as deemed necessary. Agendas for JAGCT public meetings will be available to the public at least 21 calendar-days in advance, via notice disseminated through a self-subscription electronic newsletter, AGFD's *Endangered Species Updates*.

3.2.6. JAGCT public meetings will be held in available venues in the primary emphasis area for this Framework. When possible, meetings will rotate between AZ and NM. In the event that jaguars are found to occur in other areas of AZ and/or NM, JAGCT meeting locations will be adapted to ensure that each general area of occurrence has an equitable share of the meetings. Additional meetings may be held in Mexico, if doing so would enhance collaboration between jaguar conservation efforts in Mexico and the United States.

3.2.7. The JAGCT Chair may convene committees or work groups, and appoint chairs for them, as necessary to carry out work on behalf of JAGCT. Committees convened to date include: Depredation, Education, Outreach, and Research.

3.3 Jaguar Scientific Advisory Group (JAGSAG).

3.3.1. JAGCT will provide a sound scientific basis for jaguar conservation and a forum for constructive information exchange, in part by maintaining an independent JAGSAG to review appropriate aspects of its work, such as survey, monitoring, research, and management recommendations.

3.3.2. The JAGCT Chair will appoint JAGSAG members, giving preference to individuals with extensive expertise in the areas important to jaguar conservation. JAGSAG members may serve in that capacity until they or the Chair determine otherwise.

3.3.3. JAGSAG service is voluntary, without commitment to compensation, although if funds are available JAGCT or any entity may opt to provide support to JAGSAG members for travel or other expenses directly related to their service to JAGCT. JAGSAG meetings will be held as often as needed, and may be conducted through teleconference or email to facilitate member participation.

3.3.4. The JAGCT Chair will make JAGSAG's recommendations available to the JAGCT and interested members of the public.

3.4. Conservation and Cooperation with Mexico

3.4.1. This Framework encourages participation by Mexico in JAGCT meetings, and solicits cooperation from federal, state, and local agencies and organizations in Mexico that are involved in research on or conservation of the northern jaguar population. AGFD, NMDGF, and USFWS will ensure that coordination with Mexico occurs within the framework of the Trilateral Committee. The Trilateral is comprised of federal wildlife agencies from the United States, Mexico, and Canada; other federal agencies, state agencies, nongovernmental organizations, and individuals participate on an invitation basis.

3.4.2. Through the Trilateral Committee, JAGCT will continue to encourage and support Mexico's efforts to determine the present distribution and status of jaguars and jaguar habitats in Mexico; identify areas important to natural movement of jaguars between Arizona, New Mexico, and Mexico; and develop and implement national and regional conservation strategies in Mexico for jaguars.

3.4.3. JAGCT will continue to work with Mexico toward integrating the emerging national Mexico jaguar conservation strategy and this Framework, and to make available to Mexico any relevant information from the United States. JAGCT will also cooperate at the regional and local levels, as the subcommittee that Mexico has tasked with developing a conservation strategy for the northern jaguar population begins functioning.

3.5. Cooperation with the Native American Nations

3.5.1. JAGCT will encourage Native American Tribes within the primary emphasis area for this Framework in the United States to become signatories to the MOU. JAGCT will also provide technical support, when requested, to appropriate Native American Tribes in the United States to help determine present distribution and status of jaguars and to identify possible jaguar travel areas.

4. Objectives and Conservation Actions.

Objectives to achieve the Goal of this Framework are identified below. Conservation actions are listed under each objective, but are not priority ranked. Note: Private lands will not be entered pursuant to this Framework without prior permission from the landowner(s). Note: This Framework does not provide for or support reintroduction of jaguars into AZ or NM. Reintroduction would be cost prohibitive, and not scientifically advisable this far north in the species' range.

4.1. Objective: Identify habitat characteristics and document distribution and occurrence of jaguars in the U.S.-Mexico borderlands.

4.1.1. JAGCT will review relevant literature, advocate and provide support for jaguar studies, and incorporate findings from other studies to identify and continually refine understanding of jaguar habitat-use patterns, using appropriate field-tested methods.

4.1.2. JAGCT will document northern jaguar distribution and occurrence by developing and maintaining a survey and monitoring program to detect and gather occurrence, habitat use, and other information. The program will include a voluntary-participation survey of ranchers and other rural inhabitants and users to help determine current and recent occurrence of jaguars.

4.1.3. When jaguars are found alive in Arizona and/or New Mexico, or along the International Border, AGFD, NMDGF, and USFWS will make a concerted effort to monitor their movements through the least intrusive but most effective means.

4.1.4. Through permit stipulations, AGFD and NMDGF will require that any jaguar captured in AZ or NM be reported to the appropriate state wildlife agency and USFWS before release, so they can decide whether to radio-collar and monitor it. However, if the trapped animal is in danger of debilitating injury or death, it shall immediately be released and the appropriate state wildlife agency will, if feasible, coordinate subsequent monitoring and assessment of the trap location.

4.1.5. JAGCT will coordinate and maintain a sighting report procedure and database for information about jaguar occurrence. The system and data will reside with AGFD and NMDGF, and include detailed criteria by which to assign credibility rankings to each sighting report, so confirmed records become the primary basis for JAGCT

recommendations and actions. The criteria shall address such factors as type and quality of sighting (e.g. distinct tracks, clear and well focused photograph, detailed sight record), the observer's experience with jaguars and similar species, weather conditions at time of sighting, total time that the animal was under observation, etc.

4.1.6. Possible jaguar occurrence reports will be assigned standardized credibility rankings, and evaluated by one or more experts in the field as to accuracy and importance. When a reported occurrence has been determined not to be of a jaguar, it shall be labeled as such and categorized appropriately in subsequent JAGCT reports.

4.1.7. As necessary, and in timely fashion, JAGCT will seek funding and other support from signatories, outside agencies, organizations, and individuals for the work referenced above.

4.2. Objective: Identify and map habitat of the northern jaguar population, including key linkages from Mexico to the United States.

4.2.1. JAGCT will coordinate with partners in Mexico and the United States to identify and assess areas in which jaguars occur or might occur, as transients or otherwise. At a minimum, these assessments will consider the physical features important to jaguars for connectivity. Where possible, they will also characterize other potentially important aspects or conditions (e.g. prey base).

4.2.2. AGFD and NMDGF will maintain and revise as needed state-specific maps delineating land ownership patterns overlaid with jaguar distribution information, including points of known or reported occurrence, together with habitat types in which jaguars are known to occur or likely to occur. Private lands on such maps will not list (or be described by) individual property names or owners. These maps will be a primary basis for evaluating constraints to, and opportunities for, enhancing jaguar presence within each state, i.e. they will help focus JAGCT efforts to ensure that jaguars are not killed unlawfully or unintentionally and that their ability to move freely across the landscape is not unnecessarily constrained.

4.3. Objective: Assess threats to the northern jaguar population and identify limiting factors.

4.3.1. JAGCT will, in cooperation with partners in the United States and Mexico, provide recommendations for assessing the benefits and negative impacts of current and planned actions on jaguars in the United States and Mexico.

4.3.2. JAGCT member agencies will share information on any impact assessments they conduct regarding proposed actions where jaguars might occur, and provide those results to JAGCT for informational purposes and possible referencing in reports. JAGCT member agencies may ask other member agencies to assist with impact assessments, although assessments will typically be part of the agency's

existing review and evaluation process for proposed actions (e.g. NEPA and ESA Section 7 compliance measures), where applicable.

4.4. Objective: Conserve northern jaguar population habitat, including key linkages between Mexico and the United States.

4.4.1. JAGCT will cooperate with Mexico to develop jaguar conservation recommendations and guidelines, monitor and evaluate issues of concern, and encourage land and resource managers to ensure that current and future needs for northern jaguar persistence and natural dispersal are appropriately addressed.

4.4.2. JAGCT will provide technical assistance and conservation recommendations to the Border Patrol and other federal agencies in the United States on issues that might constrain jaguar movement between the United States and Mexico (e.g. border security actions, border infrastructure, and illegal immigration) or jaguar occurrence in the United States.

4.4.3. JAGCT will identify and develop incentives for landowners to encourage presence of jaguars within the primary emphasis area, and encourage individual agencies within JAGCT to work with willing landowners to execute agreements to protect jaguar habitat, including movement corridors, through voluntary mechanisms including but not limited to conservation easements and Safe Harbor Agreements.

4.4.4. Private property owner claims in the United States for compensation for livestock lost to jaguar depredation will be referred to the Malpai Borderlands Group (MBG) for evaluation and possible payment from a fund established by MBG for that purpose. Payment will be based on compensation and jaguar kill identification guidelines approved by MBG. MBG will voluntarily provide JAGCT with updates to the guidelines, to help JAGCT work with Mexico to determine if a similar program can be developed for Mexico.

4.4.5. JAGCT will conduct local workshops to identify landowner, manager, and permittee concerns related to jaguar conservation and to develop possible solutions. Workshops will incorporate discussion of conservation biology, property rights, land-use philosophies, and other relevant topics. They will involve or be open to JAGCT members, agency decision-makers, and interested members of the public.

4.4.6. JAGCT will help implement conservation measures on private lands only in response to invitation from the appropriate landowner(s). Private property owners shall not involuntarily be subject to any such measures.

4.5. Objective: Promote Protection of Jaguars in the United States.

4.5.1. Predator control activities by signatories to the MOU will not be purposefully directed at jaguars. Such activities are subject to a variety of federal, state, and tribal

laws, local ordinances, and oversight by various federal, state, and tribal land management, wildlife management, and agricultural agencies or programs. Thus, any JAGCT discussions or recommendations regarding possible effects of area-specific predator control activities on jaguars, and measures to avoid harm to jaguars in such areas, will be carefully coordinated with the appropriate entities.

4.5.2. NMDGF will continue to work toward equalizing or increasing New Mexico's civil legal disincentives (fines) for unlawful take of jaguars, to make them commensurate with current federal fines, with implementation contingent upon federal delisting. Note: AGFD has completed this, with the Arizona penalties being held in abeyance pending federal delisting of the jaguar in Arizona, to ensure that state and federal penalties are not duplicative.

4.5.3. AGFD and NMDGF will investigate proposing increased state criminal penalties (fines and prison terms) for unlawful take of jaguars, to make them commensurate with current federal penalties under ESA. Again, implementation of increased state penalties would be contingent upon federal delisting, to ensure that state and federal penalties are not duplicative.

4.6. Objective: Conduct research to improve knowledge of jaguars, jaguar conservation, and detection and handling of jaguars.

4.6.1. JAGCT will sponsor, conduct, and encourage others to conduct research to improve knowledge of jaguars and understanding of how to conserve them in a multiple-use, private/public lands context. JAGCT will use the JAGSAG as available to review and make recommendations on research concepts and proposals.

4.6.2. JAGCT will review, and revise as necessary, its procedures for handling jaguars that are captured alive.

4.6.3. JAGCT will evaluate (in cooperation with Mexico) the feasibility and utility of a Population and Habitat Viability Analysis/Assessment (PHVA) for the northern jaguar. If a PHVA is found to be feasible, and useful, in forwarding conservation efforts, it will be conducted when and if sufficient data exist and funding is available.

4.7. Objective: Develop and implement information and education programs to promote conservation of jaguars and their habitat.

4.7.1. JAGCT will review and develop jaguar information and make it available to the public, including updating reports on status, distribution, occurrence, habitat, ecology, and conservation. Draft reports will be submitted to at least three qualified individuals in the appropriate field for review, and to the general public for comment.

4.7.2. JAGCT will promote public support of jaguar conservation by developing and distributing information and education materials (e.g. brochures, media kits, web

pages). Outreach focal points will include wildlife viewers, hunters, ranchers, farmers, other private landowners, conservation groups, and local governments. Educational materials developed by or for JAGCT shall be reviewed by at least three professional educators with appropriate expertise.

4.7.3. AGFD and NMDGF will promote jaguar conservation in conjunction with advertising their 24-hour "hot lines" (1-800 numbers) for reporting wildlife violations, and rewards for information that leads to convictions. JAGCT will seek private donations to supplement rewards offered by the state agencies for convictions in cases of unlawful take of jaguars.

4.7.4. JAGCT will develop and maintain a balanced, scripted presentation on jaguar conservation for general educational use. Any group that desires to participate in this or a similar JAGCT outreach effort, or to adapt these materials for its own use, whether or not at its own expense, must provide their materials for JAGCT review and acknowledge in the final version of said materials whether or not JAGCT endorsed the final product.

4.7.5. JAGCT will disseminate jaguar conservation information through: reports, brochures, and Web-site postings; annual hunting regulation publications; a fact sheet summarizing the status of borderlands jaguars and their conservation needs; technical and popular reports; articles for agency and other magazines; and segments for Lead Agency or Cooperator television shows.

4.7.6. When practical to do so, and contingent upon available funds, JAGCT will make its information available in Spanish as well as English.

4.8. Objective: Evaluate JAGCT progress and accomplishments.

4.8.1. Each January-February, AGFD and NMDGF will jointly develop a written report on the previous year's JAGCT effort to conserve the jaguar. The report will reference specific Objectives and Conservation Actions identified in the Framework, identify tasks that were planned for the previous year, and note whether and why the tasks were accomplished or not accomplished. AGFD and NMDGF will give JAGCT Cooperators and the public at least one 30-day review opportunity for the report, before submitting it to USFWS and making it available to the public.

4.8.2. JAGCT will use adaptive management principles to evaluate this conservation effort on an ongoing basis, and make necessary changes, based on experience, outcomes, and changed circumstances.

Literature Cited

- Allaby, M. (Editor). 1994. The concise Oxford dictionary of ecology. Oxford University Press, Oxford and New York.
- Begon, M., J.L. Harper, and C.R Townsend. 1996. Ecology: individuals, populations, and communities (third edition). Blackwell Science, Oxford.
- British Columbia Forest Service. 2007. Adaptive management initiatives in the BC Forest Service. Viewed online on May 23, 2007, at:
<http://www.for.gov.bc.ca/hfp/amhome/amhome.htm>
- Childs, J.L. 1998. Tracking the felids of the borderlands. Printing Corner Press, El Paso, Texas.
- Glenn, W. 1996. Eyes of fire: encounter with a borderlands jaguar. Printing Corner Press, El Paso, Texas.
- Johnson, T.B. and W.E. Van Pelt. 1997. Conservation assessment and strategy for the jaguar in Arizona and New Mexico. Arizona Game and Fish Department, Nongame and Endangered Wildlife Program Technical Report 105. Phoenix, Arizona.
- Johnson, T.B, W.E. Van Pelt, and J.N. Stuart. In prep. Jaguar conservation assessment for Arizona, New Mexico, and northern Mexico. Unpublished report to the Arizona Game and Fish Department (Phoenix, Arizona) and the New Mexico Department of Game and Fish (Santa Fe, New Mexico).
- Lacy, R.C. 1993-1994. What is population (and habitat) viability analysis? Primate Conservation 1993-1994 (14-15):27-33.
- Meffe, G.K., C.R. Carroll, and Contributors. 1997. Principles of conservation biology (second edition). Sinauer Associated, Incorporated, Sunderland, Massachusetts.
- Merriam-Webster. 2003. Merriam-Webster's collegiate dictionary (eleventh edition). Merriam-Webster Incorporated, Springfield, Massachusetts.
- Oglethorpe, J. (Editor). 2002. Adaptive management: from theory to practice. IUCN (The World Conservation Union). SUI Technical Series, Volume 3.
- Ricklefs, R.E. and G.L. Miller. 1999. Ecology (fourth edition). W.H. Freeman and Company, New York.
- USFWS. 1996. Black-capped vireo population and habitat viability assessment report. Compiled and edited by Carol Beardmore, Jeff Hatfield, and Jim Lewis in conjunction with workshop participants. Report of a September 18-21, 1995 workshop arranged by the U.S. Fish and

Wildlife Service in partial fulfillment of U.S. National Biological Service Grant No. 80333-1423. Austin, Texas.

USFWS. 2004. Safe harbor agreements for private landowners. U.S. Fish and Wildlife Service Endangered Species Program, Washington, D.C. Viewed June 4, 2007, at:
<http://www.fws.gov/endangered/recovery/harborqa.pdf>

Western, D. 1989. Conservation biology. Pages 31-36 *in* Western, D. and M. Pearl. (Editors). 1989. Conservation for the twenty-first century. Oxford University Press, New York and Oxford.

Appendix A: Glossary

The definitions provided below are derived from Allaby (1994), Begon et al. (1996), British Columbia Forest Service (2007), Lacy (1993-1994), Meffe et al. (1997), Merriam-Webster (2003), Oglethorpe (2002), Ricklefs and Miller (1999), and/or USFWS (1996, 2004).

- Adaptive management** (A) Adaptive management is a science-based public participation process for evaluating and adjusting a conservation effort to better achieve its objectives, as experience and knowledge are gained through implementation, study, and discussion. Adaptive management is thus “learning by doing,” and using objective analysis and informed opinion to determine the need for, and direction of, changes in relevant policies, procedures, plans, and actions. (B) Adaptive management is a systematic process for continually improving management policies and practices by learning from the outcomes of operational programs. Some of the differentiating characteristics of adaptive management are: (1) acknowledgement of uncertainty about what policy or practice is "best" for the particular management issue, (2) thoughtful selection of the policies or practices to be applied (the assessment and design stages of the cycle), (3) careful implementation of a plan of action designed to reveal the critical knowledge that is currently lacking, (4) monitoring of key response indicators, (5) analysis of the management outcomes in consideration of the original objectives, and (6) incorporation of the results into future decisions.
- Conservation:** (A) The principles and practices of the science of preventing extinction. (B) In modern scientific usage conservation implies sound biosphere management within given social and economic constraints, producing goods and services for humans without depleting natural ecosystem diversity and acknowledging the naturally dynamic character of biological systems.
- Conservation biology:** (A) A field of study involving the application of genetics and population and community ecology to problems of biodiversity loss. (B) An integrative approach to protection and management of biological diversity that uses appropriate principles and experiences from basic biological fields such as genetics and ecology; from natural resource management fields such as fisheries and wildlife; and from social sciences such as anthropology, sociology, philosophy, and economics. (C) The branch of biological sciences that deals with the effects of humans on the environment and with conservation of biological diversity (variety of life forms). It uses principles, experiences, and information (e.g.

data) from the biological sciences, natural resource management, and the social sciences, oftentimes including economics. (D) Broadly, the aims of conservation biology are as follows: (1) provide scientific conservation principles; (2) identify conservation problems; (3) establish corrective procedures; and (4) bridge science and management by making scientists responsive to the conservation problems and managers responsive to biological issues.

Dispersal: The spreading of individuals away from each other, e.g. of offspring from their parents and from regions of high density to regions of lower density.

Habitat: The place where an animal or plant normally lives, often characterized by a dominant plant form or physical characteristic (e.g. the stream habitat, the forest habitat). Examples: a species of bat might occupy a maternity roost in a cave but have its late summer roost (post breeding) in the attic of a building or an underpass on a roadway. Its winter roost might be a cave in a different (perhaps more southerly) country. In summer its foraging habitat might be pine forests in the United States, while in winter it might forage in elfin woodland in central Mexico. In short, a species' "habitat" can and often does vary seasonally, in different phases of the life cycle (juvenile, young adult, adult, senescent), in response to changing weather conditions, drought, prey abundance or shortage, or competition with or pressure from other animals. Some species have narrow habitat preferences or tolerances (for example, some mollusks). Others have relatively broad habitat preferences or tolerances (for example, jaguars and humans).

Historical range: Where a species used to occur, long ago. Oftentimes the historical range is larger than the currently occupied range, perhaps (for example) because something caused a population decline, or rendered a portion inhospitable to that species.

Population: (A) Those organisms of the same species living in the same place and time. (B) A group of individuals of one species in an area, although the size and nature of the area is defined, often arbitrarily, for the purposes of the study being undertaken. (C) A group of organisms of the same kind, usually the same species, inhabiting a given area.

Population and Habitat Viability Analysis: (A) A collaborative workshop approach to species conservation that centers on, but encompasses more than, a PVA (a quantitative assessment of the probability of species viability or

vulnerability under defined sets of assumptions and circumstances). The workshop process brings to bear the knowledge of many people (particularly an array of experts who have knowledge of the species or problem) on species conservation, eliciting and assessing multiple options for conservation action, principally by using the tool of the PVA as a way to evaluate present threats to population persistence and likely fates under various possible scenarios. (B) PHVA encompasses two different but closely related tools for analyzing the conservation status and needs of a species. A PHV Analysis usually refers to computer modeling of biological processes, whereas a PHV Assessment is an in-depth examination and synthesis of the species' life history, ecology, management, and other factors to determine courses of action to manage for viable populations. Assessments include consideration of model analysis, habitat management, captive breeding (if appropriate), genetic tracking (if appropriate), life history, status, threats, geographic distribution, education and information, other conservation efforts, human demography/dimensions, research, and any other component that is deemed necessary. By itself, model analysis would have little real world usefulness without consideration of the context in which the species lives. Habitat management, human influences, and other components are therefore assessed and added into the conservation/recovery equation, at least in a qualitative way. PHV Assessments can be thought of as a tool to compile, evaluate, and synthesize data and build a framework for conservation action.

Safe Harbor Agreements: Voluntary arrangements between the USFWS and cooperating non-federal landowner to promote management for ESA-listed species on non-federal property while giving assurances to the participating landowners that no additional regulatory restrictions will be imposed.

Appendix B

Memorandum of Understanding between the Arizona Game and Fish Department and the New Mexico Department of Game and Fish for Jaguar Conservation

Introduction

This Memorandum of Understanding (MOU) for a state-led jaguar (*Panthera onca*) conservation program is made and entered into by and among the Arizona Game and Fish Department (AGFD), the State of New Mexico Department of Game and Fish (NMDGF), and various government agencies that become signatories as described below. AGFD is authorized to enter into this MOU by A.R.S. § 17-231.B.7. NMDGF is authorized to enter into this MOU by New Mexico Statutes Annotated, Chapter 17 Game and Fish; NMSA 1978. The U.S. Fish and Wildlife Service (USFWS) has the authority to enter into this MOU through the Endangered Species Act of 1973, as amended; the Fish and Wildlife Act of 1956, as amended; the Fish and Wildlife Coordination Act, as amended; and 43 CFR part 24, U.S. Department of Interior's fish and wildlife policy on state and federal relationships.

The primary emphasis area for conservation action under this MOU is defined as (see also Fig. 1): Arizona, including all or parts of Santa Cruz, Pima, Pinal, Graham, Greenlee, and Cochise counties; and New Mexico, including all or parts of Catron, Sierra, Luna, Grant, and Hidalgo counties. However, outreach and other conservation-related activities may take place over a broader area, including outlying areas of Arizona, New Mexico, and northern Mexico.

Collectively, AGFD and NMDGF are referred to herein as the Lead Agencies for this MOU, and are jointly responsible for leading this conservation effort.

Collectively, all other signatories to this MOU are referred to herein as Cooperators. Entities that AGFD and NMDGF invite to participate as Cooperators include the following government agencies: state and federal wildlife and/or land management agencies with statewide responsibilities in Arizona and/or New Mexico; tribal wildlife agencies and county governments with management responsibilities within the primary emphasis area defined above for this MOU; the Natural Resource Conservation Districts (NRCDS) of Arizona and Soil and Water Conservation Districts (SWCDs) of New Mexico that lie within the primary emphasis areas defined above; and state and federal wildlife management agencies in Mexico that have responsibilities within the area of northern Mexico in which jaguars are known to occur (i.e. Chihuahua and Sonora).

Memorandum of Understanding
Re: Jaguar Conservation

Final: March 21, 2007
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Purpose

The purpose of this MOU is to further jaguar conservation through cooperation among government agencies and the public by implementing the *Conservation Assessment and Strategy for the Jaguar in Arizona and New Mexico* (Johnson and Van Pelt. 1997. Arizona Game and Fish Department Nongame and Endangered Wildlife Program Technical Report 105. Phoenix, Arizona). The intent is to provide for broad, voluntary participation in the conservation effort, with the Lead Agencies and Cooperators carrying the principal administrative and financial burdens for implementation. [Note: the aforementioned conservation assessment and strategy is being revised to become a *Jaguar Conservation Framework for Arizona, New Mexico, and Northern Mexico*, which AGFD and NMDGF will approve and submit to USFWS for acceptance. USFWS will recuse itself from any vote within JAGCT on the Framework, due to its responsibility for determining adequacy of the Framework after submittal by the Lead Agencies.]

Witnesseth

WHEREAS, (a) the jaguar historically occurred in the Arizona-New Mexico/Mexico borderlands, and continues to occur as a resident (breeding) population in northern Mexico and at least occasionally in Arizona and New Mexico (only males have been documented in AZ-NM since the mid-1900s); (b) the jaguar's current population status throughout the borderlands is not well known, (c) unlawful killing of borderlands jaguars is an ongoing concern, (d) public education, protection from unlawful take, minimal restriction of natural movement, and presence of a healthy core population in northern Mexico are thought to be keys to continued jaguar presence in the AZ-NM/Mexico borderlands, (e) jaguar management in the borderlands would be improved by better information about jaguar movements, food habits, habitat use, and general behavior in that area, and (f) a voluntary partnership among parties responsible for and/or interested in the jaguar can be an effective means of conserving the species.

WHEREAS, the Arizona Game and Fish Department, a State resource agency, has determined that conservation of the jaguar is consistent with (a) its statewide program to manage nongame and endangered wildlife, and (b) its "Cooperative Agreement for Conservation of Endangered Species" with the U.S. Fish and Wildlife Service pursuant to Section 6 of the Endangered Species Act of 1973, as amended.

WHEREAS, the New Mexico Department of Game and Fish, a State resource agency, has determined that conservation of the jaguar is consistent with (a) its mission to maintain and, to the extent possible, enhance the numbers of wildlife indigenous to the state, within the carrying capacity of the habitat, and (b) its "Cooperative Agreement for Conservation of Endangered Species" with the U.S. Fish and Wildlife Service pursuant to Section 6 of the Endangered Species Act of 1973, as amended.

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NOW THEREFORE, in consideration of the above premises, the signatories enter into this MOU as partners to accomplish its purpose.

All Signatories to this MOU agree to:

1. Recognize AGFD and NMDGF as the Lead Agencies for this MOU. As such, AGFD and NMDGF will provide the primary administrative and logistical support for this MOU.
2. Participate in a Jaguar Conservation Team (JAGCT), established to implement this MOU and composed of the Lead Agencies and signatory Cooperators. The JAGCT shall meet in public session not less than once each year, rotating meetings geographically through the primary emphasis areas of Arizona and New Mexico as necessary to facilitate broad public participation. Except as noted below, each Lead Agency and Cooperator shall designate one voting representative to the JAGCT. Signatories may not vote by proxy assigned to another Signatory. Exceptions: (a) the Bureau of Land Management may (if it so desires) designate one voting representative for Arizona and another for New Mexico; (b) the NRCs in the primary emphasis area of Arizona are treated under this MOU as a single voting Cooperator, but may (if they so desire) collectively designate two voting representatives to represent all the NRCs in that area; and (c) the SWCDs in the primary emphasis area of New Mexico are treated under this MOU as a single voting Cooperator but may (if they so desire) collectively designate two voting representatives to represent all the SWCDs in that area.
3. Recognize AGFD or NMDGF as Chair of the state-convened JAGCT. By mutual agreement, AGFD and NMDGF will determine which of them will serve as Chair.
4. Assist in developing, and if it is approved, implementing (and updating, as necessary) the *Jaguar Conservation Assessment and Framework for Arizona, New Mexico, and Northern Mexico* (AGFD and NMDGF 2007).
5. Provide, subject to availability, funding, facilities, equipment, logistical and staff support, and access to lands under their control, as necessary to implement this MOU.
6. Participate regularly in JAGCT meetings to enhance communication and cooperation among all interested and affected parties; help accomplish agreed-upon tasks; develop plans, reports, recommend actions, and public information and educational materials; provide ongoing review of, and feedback on, this conservation effort; cooperate in development of major media releases and outreach efforts; keep state and local governments, communities, the conservation community, citizens, and other interested and affected parties informed, and solicit their input on issues and actions of concern or interest to them; develop voluntary opportunities and incentives for local communities and private landowners to participate in this conservation effort, including ways that might provide local economic benefits; and assist in securing the funds necessary to implement this conservation effort.

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The Arizona Game and Fish Department agrees to:

1. Facilitate issuance of necessary authorizations and State permits pursuant to Title 17, Arizona Revised Statutes, to NMDGF and other Cooperators on a timely basis as sanctioned under the relevant State laws and rules.
2. Carry-out administrative and field actions as necessary to support this conservation effort.

The New Mexico Department of Game and Fish agrees to:

1. Facilitate issuance of necessary authorizations and State permits pursuant to the New Mexico Wildlife Conservation Act, New Mexico Revised Statutes, to AGFD and other Cooperators on a timely basis as sanctioned under the relevant State laws and rules.
2. Carry-out administrative and field actions as necessary to support this conservation effort.

The U.S. Fish and Wildlife Service agrees to:

1. Recognize this conservation effort as a state-led conservation program for the jaguar, in accordance with the Endangered Species Act of 1973, as amended.
2. Carry-out administrative and field actions as necessary to support this conservation effort.

It is Further Mutually Agreed and Understood by and among all Signatories that:

1. Specific work projects or activities that involve transfer of funds, services, or property among signatories to this MOU may require execution of separate agreements or contracts.
2. JAGCT is an advisory body to the Lead Agencies, and does not of itself own, manage, or otherwise control any land, water, or wildlife. Thus, actions proposed or recommended by JAGCT may require amendments to existing land use or other plans, and environmental analysis, or undergo other acceptance or review processes within individual agencies, before an action agency determines whether to approve and/or implement them.
3. Nothing in this MOU shall obligate the signatories to expend appropriations or to enter into any contract or other obligations.
4. This MOU may be substantively modified or amended on written request by any signatory, subject to written concurrence by all signatories. However, signatories may be added to this MOU on their written request and subsequent concurrence by both Lead Agencies and by concurrence (as indicated by voice vote) of a majority of the Cooperators present at a public meeting of the JAGCT where such requests are considered.

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5. Signatory participation in this MOU is voluntary, and any signatory may terminate its participation by providing 60-days written notice to the JAGCT Chair.
6. This MOU shall have a term of five (5) years from the date of the last signature of approval by a Lead Agency. At the end of this period, this MOU will expire unless it has been canceled, extended, or renewed by the Lead Agencies.
7. Conflicts between or among signatories concerning procedures or actions under this MOU that cannot be resolved by signatory representatives to the JAGCT shall, as necessary, be referred to the next higher level within each signatory agency for resolution.
8. The State of Arizona Required Provisions (Appendix A) are hereby made part of this MOU.

In Witness Whereof:

The Lead Agency signatories hereto have executed this MOU as of the date for each signature below.

Duane L. Shroufe
Duane L. Shroufe, Director
Arizona Game and Fish Department

3-22-07
Date

Bruce C. Thompson
Bruce C. Thompson, Director
New Mexico Department of Game and Fish

3-22-07
Date

Additional signatories (Cooperators) will be added as they declare their desire to sign onto this MOU and they are accepted per the guidelines above. A separate signature page will be used for each Cooperator, to facilitate execution of this document and to record the date on which that agency became signatory to the MOU. The signatory Cooperators to date are also listed below, for convenience:

Cooperator

Date of Signature

Benjamin N. Tuggle
Benjamin N. Tuggle, Regional Director
U.S. Fish and Wildlife Service, Region 2

3-22-07
Date

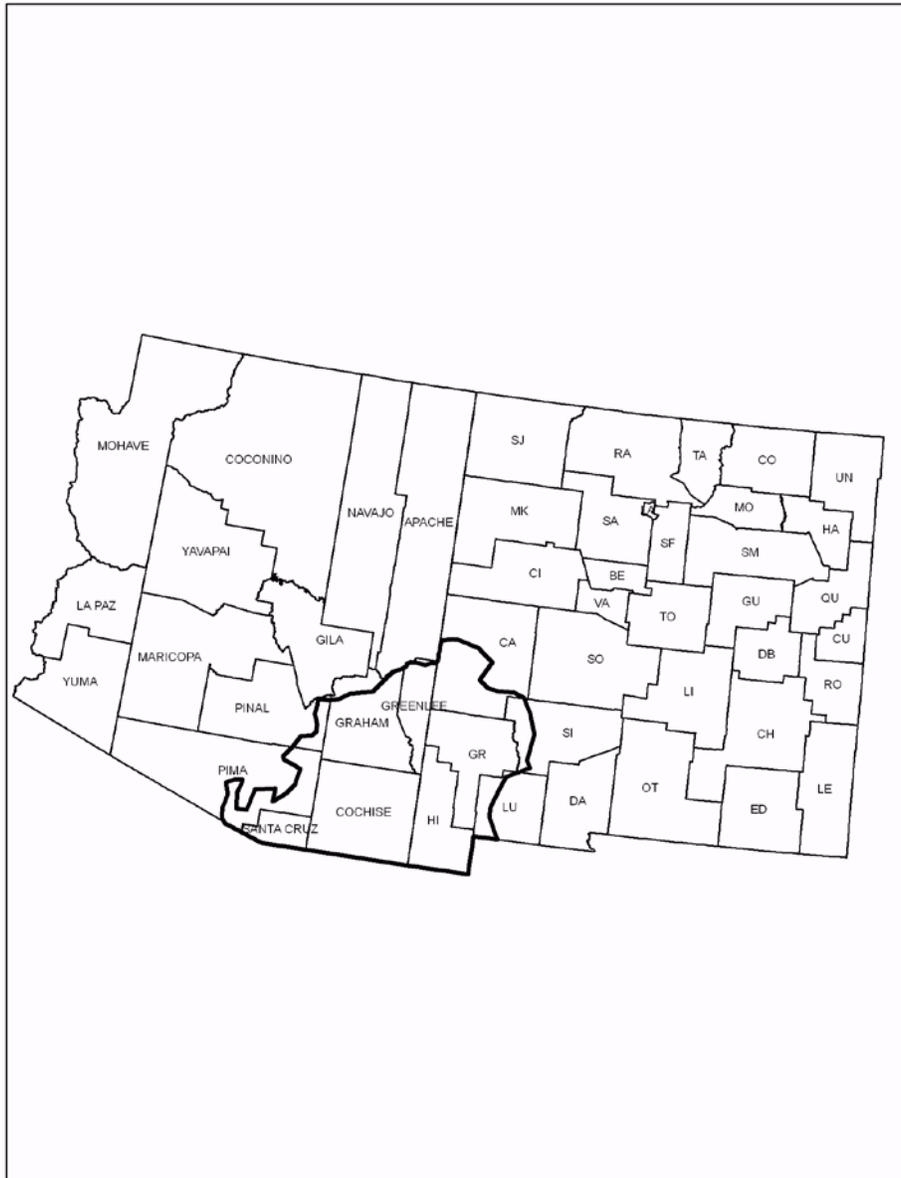


Figure 1. Emphasis area for conservation action under the Memorandum of Understanding between the Arizona Game and Fish Department and the New Mexico Department of Game and Fish for jaguar conservation. In Arizona, the area consists of all or parts of Pima, Santa Cruz, Graham, Greenlee, and Cochise counties. In New Mexico, the area consists of all or parts of Hidalgo, Grant, Luna, Sierra, and Catron counties.

Appendix A

State of Arizona Required Provisions

1. Non-discrimination. In carrying out the terms of this agreement, the Parties agree to comply with Executive Order 99-4 prohibiting discrimination in employment, the provisions of which are incorporated herein by reference.
2. Records Retention and Audit. Pursuant to A.R.S. § 35-214, all books, accounts, reports, files, electronic data, and other records relating to this agreement shall be subject at all reasonable times to inspection and audit by the State of Arizona for five (5) years after completion of this agreement.
3. Arbitration. The parties agree to engage in any alternative dispute resolution procedures authorized by their statutes, regulations and court rules, including, but not limited to, 5 U.S.C. § 575 and A.R.S. § 12-1518.
4. Termination for conflict of interest. This agreement is subject to termination pursuant to A.R.S. § 38-511.
5. Termination for Non-Availability of Funds. Every obligation of the Parties under this agreement is conditioned upon the availability of funds appropriated or allocated for the payment of such obligation. If funds for the continuance of this agreement are not allocated or are not available, this agreement shall terminate automatically on the date of expiration of funding. In the event of such termination, the Parties shall incur no further obligation or liability under this agreement other than for payment of services rendered prior to the expiration of funding.
6. Illegal Immigration. The Parties agree to comply with Executive Order 2005-30, "Ensuring Compliance with Federal Immigration Laws by State Employers and Contractors," the provisions of which are hereby incorporated by reference.

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